

CLAIMS

What is claimed is:

1. A method of recovering a nitramine from a nitramine-containing aluminized energetic material, comprising:

treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid to digest the at least one binder into solution while neither solvating nor solvolyzing into solution at least substantially all of the nitramine; and

recovering at least a portion of the nitramine.

2. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material further comprises adding at least one plasticizer to the aluminum, the nitramine, and the at least one binder, and wherein treating a nitramine-containing aluminized energetic material further comprises digesting the at least one plasticizer into solution.

3. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material further comprises adding at least one plasticizer and at least one inorganic oxidizer to the aluminum, the nitramine, and the at least one binder, and wherein treating a nitramine-containing aluminized energetic material further comprises digesting the at least one plasticizer and the at least one inorganic oxidizer into solution.

4. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprising at least 5 weight percent nitric acid.

5. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprising at least 20 weight percent nitric acid.

6. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprising at least 35 weight percent nitric acid.

7. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprising not more than 55 weight percent nitric acid.

8. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises neither solvating nor solvolyzing at least 98% of the nitramine of the nitramine-containing aluminized energetic material into solution.

9. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises neither solvating nor solvolyzing at least 99% of the nitramine of the nitramine-containing aluminized energetic material into solution.

10. The method of claim 1, further comprising using digested portions of the nitramine-containing aluminized energetic material and residual nitric acid as feed stock for commercial blasting agents.

11. The method of claim 1, wherein recovering at least a portion of the nitramine comprises recovering at least 90 weight percent of the nitramine.

12. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine comprising at least one member selected from the group consisting of 1,3,5,7-tetranitro-1,3,5,7-tetraazacyclooctane (HMX), 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX), 4,10-dinitro-2,6,8,12-tetraoxa-4,10-diazatetracyclo[5.5.0.0^{5,9}0^{3,11}]dodecane (TEX), and 2,4,6,8,10,12-hexanitro-2,4,6,8,10,12-hexaazatetracyclo[5.5.0.0^{5,9}0^{3,11}]dodecane (CL-20), and at least one binder in aqueous nitric acid.

13. The method of claim 1, wherein treating a nitramine-containing aluminized energetic material comprising aluminum, a nitramine, and at least one binder in aqueous nitric acid comprises using a weight ratio of the aqueous nitric acid to the nitramine-containing aluminized energetic material in a range of about 4:1 to about 6:1.

14. A method of recovering 1,3,5,7-tetranitro-1,3,5,7-tetraaza-cyclooctane (HMX) from an aluminized energetic material, comprising:

treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid to digest the binder into solution while neither solvating nor solvolyzing into solution at least substantially all of the HMX; and
recovering at least a portion of the HMX.

15. The method of claim 14, wherein treating an aluminized energetic material further comprises adding at least one plasticizer to the aluminum, HMX, and at least one binder, and

wherein treating the aluminized energetic material further comprises digesting the at least one plasticizer into solution.

16. The method of claim 14, wherein treating an aluminized energetic material further comprises adding at least one plasticizer and at least one inorganic oxidizer to the aluminum, HMX, and at least one binder, and wherein treating an aluminized energetic material further comprises digesting the plasticizer and the inorganic oxidizer into solution.

17. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprising at least 5 weight percent nitric acid.

18. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprising at least 20 weight percent nitric acid.

19. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprising at least 35 weight percent nitric acid.

20. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprising not more than 55 weight percent nitric acid.

21. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises neither

solvating nor solvolyzing at least 98% of the HMX of the aluminized energetic material into solution.

22. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises neither solvating nor solvolyzing at least 99% of the HMX of the energetic material into solution.

23. The method of claim 14, further comprising using digested portions of the aluminized energetic material and residual nitric acid as feed stock for commercial blasting agents.

24. The method of claim 14, wherein recovering at least a portion of the HMX comprises recovering at least 90 weight percent of the HMX.

25. The method of claim 14, wherein treating an aluminized energetic material comprising aluminum, HMX, and at least one binder in aqueous nitric acid comprises using a weight ratio of the aqueous nitric acid to the aluminized energetic material in a range of about 4:1 to about 6:1.